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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/098,650	03/15/2002	Bernhard Jakoby	10191/2310	7377

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EXAMINER

GARBER, CHARLES D

ART UNIT	PAPER NUMBER
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2856

DATE MAILED: 08/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/098,650

Applicant(s)

JAKOBY ET AL.

Examiner

Charles D. Garber

Art Unit

2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-11 and 13-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-11 and 13-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 06/28/2004 have been fully considered but they are not persuasive.

Applicant argues that the Martin reference does not teach immersing the sensor elements and that figure 8 of the Martin reference discloses a vessel for retaining the liquid being measured.

Firstly, Examiner does not agree that the figure shows a vessel. Secondly, Martin on page 216 recites the sensor response is measured "upon immersion".

Applicant also argues against combining the Rudkin reference shroud with Martin because the Martin "base prevents liquid from flowing in or out of the base" and consequently there are not "foreign bodies" for which the shroud is intended to block. Further, that the "modification would reduce the integrity of the sensor by allowing foreign bodies to enter the container" shown in figure 8.

Examiner does not consider that Martin discloses a container. Figure 8 shows two round resonators and one resistance temperature device formed on a rectangular piece of quartz. There is also a base upon which to mount the sensor and connector as is typical in the art. Such a sensor would benefit from a protective shroud as previously discussed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2856

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, 7, 9-11, 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. ("Sensing liquid properties with thickness-shear mode resonator", Sensors and Actuators A 44 (1994) 209-218) in view of Rudkin et al. (US Patent 4,922,745), Schultz et al. (US Patent 5,337,605) and Igaki et al. (US Patent 6,479,763).

Regarding claims 1, 2, 13 Martin discloses device and method using piezoelectric properties of quartz crystal to determine density and viscosity of liquids (abstract and introduction). Figure 8 shows the device with a base with connectors and sensors. The base portion may be considered a bottom. The sensor resonance frequency changes "with liquid immersion". This is considered equivalent to an immersible container being immersed in the liquid during a measurement of the property of the liquid as in the instant invention. Texture on the resonator is shown to completely cover the sensor surface so Examiner considers the resonator may be completely immersed in the liquid during the measurement of the property of the liquid. Figure 8

also shows electric contact points for an electric control. As the device is capable of functioning while immersed in liquid the contacts are considered to resistant to the liquid to some degree. The RF connectors shown in the figure allow the sensor leads to be connectable to a measuring unit outside the liquid.

The reference does not expressly teach the sensor enclosed in a cap and at least one of a liquid inlet and liquid outlet.

Rudkin discloses similar fluid transducer using fluid resonant interaction to discern viscosity and density (abstract) with sensor portions 41, 42, 43, 44, 47, 48 shown in figure 4 completely immersed in the fluid being measured. Rudkin teaches an optional shroud 103 surrounding the sensor elements and an orifice 105 in the end which allows ingress as well as egress of fluid to be metered (column 3 lines 25-54 and figure 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a shroud with fluid ingress (inlet) and egress (outlet) in order to offer protection which "may be important where foreign bodies within a metered fluid are likely to impact".

The references also do not expressly teach a conductive adhesive containing metal coupling the electric lead conductors to the electric contact points.

Schultz teaches using "metal-filled conductive adhesive" to make the conductive connection between sensor contact pads 23, 24 and leads 17, 18 (column 4 line 56 to column 5 line 2 and figure 11 at item 40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use metal filled adhesive potting to join the leads and pads as it advantageously "prevents corrosion or degradation of the connection" from moisture which would be a problem for a sensor immersed in liquid.

Finally, the references do not expressly teach the metal in the adhesive is in the form of particles.

Igaki teaches conductive adhesive agents used for joining electrical components "conventionally...have comprised metal particles such as conductive silver and copper, etc., having been made to disperse in a viscous resin for fixation or cure-type resin paste."

It would have been obvious to one having obvious to one having ordinary skill in the art at the time the invention was made to use metal filler in the form of particles in a conductive adhesive because this is conventional practice. Conventional practices are advantageously conforming to established practice or accepted standards that simplify their use.

As for claim 3, Martin discloses disk shaped quartz crystal with AT cut operating in Thickness Shear Mode (TSM) (abstract and figure 1)

As for claim 4, Martin discloses testing at least glycerol which is a liquid, $C_3H_8O_3$, obtained from fats and oils.

As for claim 5, see Martin, Page 214, top of Column 2.

As for claim 7, the references do not expressly teach bifurcated contact spring conductors. Examiner takes Official Notice that it would have been obvious to one of

ordinary skill in the art at the time of the invention to use bifurcated contact spring conductors because these are widely known have been used since the early days of radio for easy removal and installation of interchangeable quartz crystals.

Regarding Claims 9 and 11, see bushing at top center of Fig 2 with two conductors.

Regarding Claim 10, Martin fails to teach glass bushings. However, Examiner takes Official Notice that it is notoriously well known in the electrical arts and one of ordinary skill in the art at the time would have employed glass feed-throughs for protection and insulation.

Regarding Claims 15-16; see Igaki, column 6, lines 1-5 teaching the use of phenolic, epoxy and polyimide resins. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use these if the adhesive of choice is a cure type adhesive agent.

Regarding Claim 18; see Igaki, Column 19, Line 23 teaching particles in this range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use particle in this range as they are "preferable" for conductive adhesive.

Regarding Claim 19 for densities of gold, nickel and resin of 19.3gm/cc, 8.9gm/cc and 1 gm/cc, respectively, 1 cc of metal meets the claim requirement and is given by Igaki at Column 7, Lines 43-47. One having ordinary skill in the art at the time the invention was made would have used these quantities in order to gain a desirable "stress-resistant effect".

Regarding Claim 14, the shroud is capable of being hermetically sealed.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martin et al. ("Sensing liquid properties with thickness-shear mode resonator", Sensors and Actuators A 44 (1994) 209-218) as modified by Rudkin et al. (US Patent 4,922,745), Schultz et al. (US Patent 5,337,605) and Igaki et al. (US Patent 6,479,763) and applied to claim 1 and further in view of Kitsuta (JP 06347339A)

The references lack electric lead conductors are one of gold-plated wires and chromium-plated wires.

Kitsuta teaches wire 5 of stainless steel plated with gold as a lead (see English language abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use gold plate wire leads which offer superior heat conduction for solderability and electrical conduction for signal fidelity.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles D. Garber whose telephone number is (571) 272-2194. The examiner can normally be reached on 6:30 a.m. to 3:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cdg

A handwritten signature in black ink, appearing to read 'CDG', with a long horizontal stroke extending to the right.